A·R·S SCIENCE HALL ·OF· FAME

June 12, 1990

Agricultural Research Service
United States Department of Agriculture

1986
Edward F. Knipling

1987
Howard L. Bachrach
Myron K. Brakke
Glenn W. Burton
Wilson A. Reeves
Ernest R. Sears
Orville A. Vogel
Cecil H. Wadleigh

1988
Francis E. Clark
Edgar E. Hartwig
Ralph Edward Hodgson
Hamish N. Munro
José Vicente-Chandler

1989
Douglas R. Dewey
Theodor O. Diener
Karl Norris
John F. Sullivan

The Agricultural Research Service Science Hall of Fame

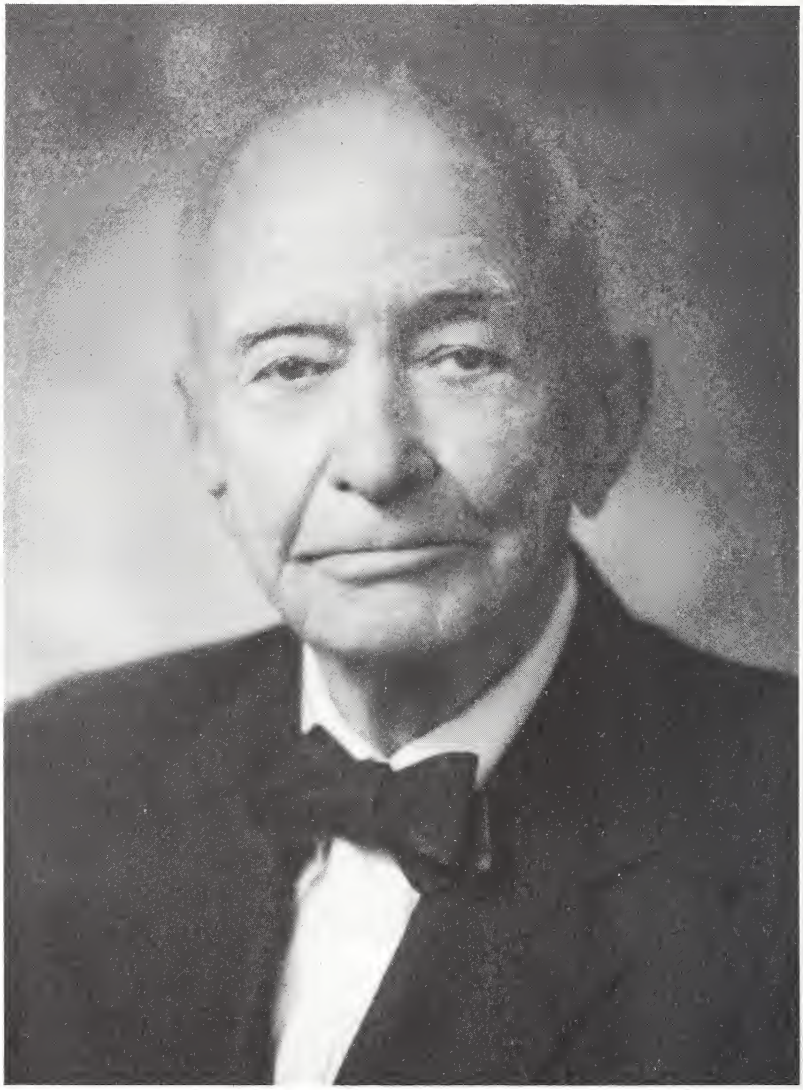
The ARS Science Hall of Fame was inaugurated in 1986. We determined that each succeeding year, one or more present or former scientists with the Agricultural Research Service could be selected, subject to the following criteria:

- The selectee's research must have contributed significantly to the solution of a major agricultural problem and reflect credit on the Agricultural Research Service.
- The selectee is recognized nationally and internationally by his or her peers in the scientific community.
- The selectee's character and record of achievement is worthy of emulation by younger agricultural scientists.
- The selectee must be either retired or eligible to retire and must continue to be professionally active.

Today we honor several outstanding scientists by inducting them into the Science Hall of Fame. A plaque citing the achievements of each will be on permanent display in the ARS National Visitor Center at the Beltsville Agricultural Research Center.

R. Dean Plowman
Administrator

June 12, 1990



1990

Theodore C. Byerly
Deputy Administrator (retired)
Agricultural Research Service
Washington, D.C.

For extraordinary contributions as a scientist, research leader, and administrator to the success of agricultural research programs and advances in U.S. and world agriculture.

Theodore C. Byerly directed research that produced many major advances in poultry science, including discovery of the superiority of selectively bred hybrids in egg and poultry production, development of the Beltsville white turkey (a widely popular small turkey that was quickly adopted by the poultry industry) and of the fatherless turkey, and basic discoveries about vitamin B12, which is essential to the survival of newly hatched chicks.

His research on how nutrition, genetics, and environmental factors affect hatchability of chicks contributed greatly to an increase in hatchability (from 65 percent to 85 percent) that has saved the poultry industry $60 million a year.

Under his leadership as chief of the Animal Husbandry Division and Assistant Director of Livestock Research, ARS researchers made major contributions in understanding of population genetics of poultry, beef, sheep, and swine. Especially significant was industry application of selection methods for improving meat hogs, particularly lean/fat ratio.

Dr. Byerly left ARS in 1963 for a series of increasingly responsible administrative positions in USDA. He was instrumental in formation of the American Institute of Biological Sciences, of which he is also a past chairman.

Dr. Byerly is a fellow of the American Association for the Advancement of Science and a member of the Poultry Hall of Fame. He retired in 1973, but he has stayed active as a consultant and teacher. He is a founding director and president of the Friends of Agricultural Research, Beltsville.

1990

Gordon Edwin Dickerson
Research Animal Geneticist (retired)
Roman L. Hruska U.S. Meat Animal Research Center
Clay Center and Lincoln, Nebraska

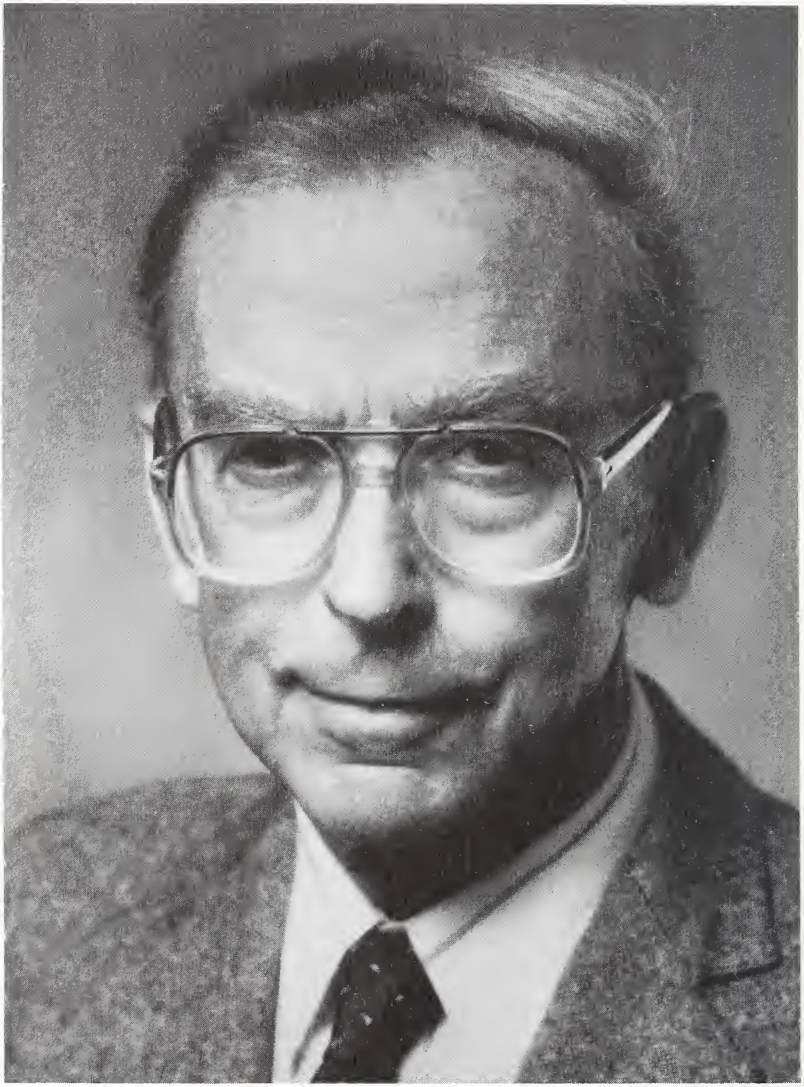
For research contributions widely used by breeders to increase production efficiency of cattle, sheep, swine, and poultry.

Gordon E. Dickerson has concentrated his research and teaching for over 50 years on concepts and procedures for genetic improvement of economic efficiency in animal production. He has always fostered collaborative research with associates and students.

In 1944, he and L.N. Hazel published two papers, the first to show how length of interval between generations, plus the intensity and accuracy of selection, can be used to predict the relative emphasis on information about pedigree, individual, family, and progeny needed to achieve maximum genetic improvement. Dr. Dickerson's research with swine and poultry clarified limitations on response from selection to be expected from concurrent inbreeding, genetic antagonisms among component traits, changing environmental effects on expression of genetic differences, and loss of superior gene-combination effects from random recombination.

He reported the results from unique poultry industry application of direct selection within parent lines for egg-laying performance of line-crossed progeny, measured in commercial flock environments. He also developed experimental designs for (1) evaluating breeds and inbred lines, (2) predicting results from cross-breeding systems and composite breeds, and (3) separating genetic from environmental changes over time.

Dr. Dickerson has received the Morrison Award from the American Society of Animal Science and service awards from the Beef Improvement Federation and the National Swine Improvement Federation. Since he retired in 1987, he has continued publishing and consulting as a collaborator in ARS.



1990

Robert W. Holley
Research Chemist
Plant, Soil, and Nutrition Laboratory
Ithaca, New York

For isolation and characterization, including the first nucleotide sequence, of transfer ribonucleic acid (tRNA).

In 1956, Robert W. Holley discovered a class of ribonucleic acids (RNA's) now known as transfer RNA's (tRNA's). Transfer RNA's have a low molecular weight and are only about 80 nucleotides long—small enough that it was possible, for the first time, to determine the structure and function of a nucleic acid.

As part of his research with yeast cells, Dr. Holley isolated, from a mixture of more than 20 tRNA's, a tRNA that was pure enough for structure analyses. He decided to use the countercurrent fractionation procedure, which proved to be an excellent choice for purifying tRNA's. From the original discovery to publication of the first nucleic acid sequence took Dr. Holley and his co-workers 9 laborious years. In 1965, they published the sequence of the alanine tRNA.

Determination of the sequence required Dr. Holley and his co-workers to invent new ways to isolate pure material and to devise innovative means of cleaving the RNA and of identifying unusual nucleotides. They worked at the limits of sensitivity of their methods because of the small amount of material available.

Dr. Holley was awarded the 1968 Nobel Prize in Physiology and Medicine (with H.G. Khorana and M.W. Nirenberg) for "interpretation of the genetic code and its function in protein synthesis," the results of his research while working for ARS. He also received the Albert Lasker Award for Basic Medical Research in 1965. From 1969 to 1987, he held an American Cancer Society Research Professorship, and he now conducts research at the Salk Institute on factors regulating cell division.

1990

Virgil A. Johnson
Research Leader (retired)
Wheat Research
Lincoln, Nebraska

For outstanding contributions to development of superior bread wheat cultivars and of improved wheat germplasm and for vigorous promotion of national and international cooperation among wheat breeders.

Virgil A. Johnson is co-developer of 28 improved wheat cultivars that have set new standards of productivity and performance stability for hard red winter wheat in the United States and in similar production areas in other countries (such as Turkey and South Africa). These cultivars have occupied as much as 25 percent of the entire U.S. wheat acreage and since 1960 have resulted in an increase in farmer income of $100 million a year.

Cultivars that he developed have provided a germplasm base for many other U.S. and foreign wheat breeding programs. Dr. Johnson's pioneering research on inheritance and physiology of protein content in wheat established that genes affecting protein content and quality are widely distributed. He combined protein genes from diverse sources in high protein germplasm and in the high protein cultivar Lancota. The protein genes have been used by breeders worldwide.

He recognized in 1969 that, in many parts of the world, the wheat consumed locally must also be grown locally. So he established an International Winter Wheat Performance Nursery network to evaluate improved wheat germplasm at local sites. Today there are 60 such sites in all 34 major winter wheat producing countries.

Dr. Johnson is a fellow of the American Association for the Advancement of Science and the recipient of the 1981 USDA Distinguished Service Award and the 1984 International Agronomy Award from the American Society of Agronomy. Since his retirement from ARS in 1986, he has taken part in several national and international activities including membership on the National Academy of Sciences/National Research Council Subcommittee on Plant Genetic Resources.

1990

George F. Sprague
Investigations Leader
Corn and Sorghum Investigations
Beltsville, Maryland

For outstanding contributions to effective methods of hybrid corn breeding and germplasm improvement.

George F. Sprague contributed significantly to development of methods for identification and production of superior corn hybrids that are widely considered to be among the greatest plant breeding achievements of the 20th century.

He integrated theoretical quantitative genetics and applied plant breeding. He developed Stiff Stalk Synthetic, which became one of the most important germplasm sources of lines. He isolated two lines (B14 and B37) from Stiff Stalk Synthetic that are among the most widely used in commercial hybrids. Many of the papers describing his research results are considered classic references in corn genetics and breeding.

Dr. Sprague was primarily responsible for six principles that are among the most important contributions to modern plant breeding. Among them:

> Basic genetic information can be derived from properly designed breeding programs, and breeding methods can become more effective by application of basic genetic and statistical principles.

He has long been a consultant with the Rockefeller Foundation and has traveled widely in that role. He was involved with the Marshall Plan for the revitalization of war-devastated Europe after World War II and was instrumental in the rapid spread of hybrid corn in Europe. Since 1963, he has played a central role in USDA's participation in improvement of cereal production in Africa.

Dr. Sprague is a fellow of the National Academy of Sciences and is a recipient of the Wolf Prize in Agriculture. He retired from ARS in 1973 and is currently Distinguished Professor of Genetics and Plant Breeding, Department of Agronomy, University of Illinois, Urbana.